

A NEW SPECIES OF *GYMNODAMAEUS* FROM COLORADO  
(Acarina: Cryptostigmata, Gymnodamaeidae)<sup>1</sup>

Tyler A. Woolley<sup>2</sup>

ABSTRACT.— The taxonomic history of the genus *Gymnodamaeus* is reviewed for North American species. A new species, *Gymnodamaeus chalazionus*, is described from Colorado and compared with species from both the western and eastern U.S. Among other features, the new species differs from *G. veriornatus* Higgins, 1961, in the shorter interlamellar hairs and the surface structure of the notogaster and genital plates. The new species is also compared with *G. quadricaudatus* Jacot, 1937, *G. pearsei* and *minor* Banks, 1947; with *G. gildersleeveae* and *ornatus* Hammer 1952, from Canada, and with *G. elegantulus* Hammer, 1958, from South America. Twelve scanning electron micrographs are used to delineate some of the details of integument and other features.

Relatively few species of the genus *Gymnodamaeus* have been described in the years subsequent to Berlese's earlier descriptions in 1910, 1916. Grandjean (1928) described *Gymnodamaeus hispanicus* from Spain and differentiated it from all other species described prior to his article on the basis of the ornamentation of the notogaster. He assumed that the surface structure was the result of secreted materials. He also indicated that no descriptions of larvae or nymphs had been made prior to his article, in which he included some descriptions of these stages.

Jacot (1937) described, but did not figure, the species *G. quadricaudatus* from Bent Creek Experimental Forest, N. C., a small form (0.40mm by 0.23mm) with four posterior notogastral nubbins. Banks (1947) described and figured *G. pearsei* and *G. minor* from Duke Forest and Durham, N. C. Hammer (1952) found *G. ornatus* and *G. gildersleeveae* in Canada. Later (1958), she described *G. elegantulus* from the Andes mountains. In the same year, Balogh (1958) described, but did not figure, *G. tunicatus* from tropical Africa.

Higgins (1961) described *G. veriornatus* as a new species from Utah and compared it with Hammer's species from the McKenzie Delta of northern Canada.

Grandjean (1965) discussed the Gymnodamaeioidea as a new superfamily in the context of a subnormal tracheal system, but did not delineate any new species within the family or superfamily.

A collection of mites from Mt. Meeker Camp Ground, Colorado, in 1952 had a series of nine specimens of the genus *Gymnodamaeus*, which at the time were not assignable to a species category. These specimens were later observed and determined to constitute a new species but have remained undescribed until now. The new species has been compared with specimens of *G. veriornatus* and checked against other described species in the literature. With the discovery

<sup>1</sup>Research supported in part by NIH TG AI00094-70; also in part by a research grant from Great Western Sugar Company, 31-1880-6257.

<sup>2</sup>Department of Zoology, Colorado State University, Fort Collins, Colorado 80521.

of additional specimens from other locations, and the use of representatives of this species in SEM research, it is expedient that the description be published.

*Gymnodamaeus chalazionus*, n. sp.

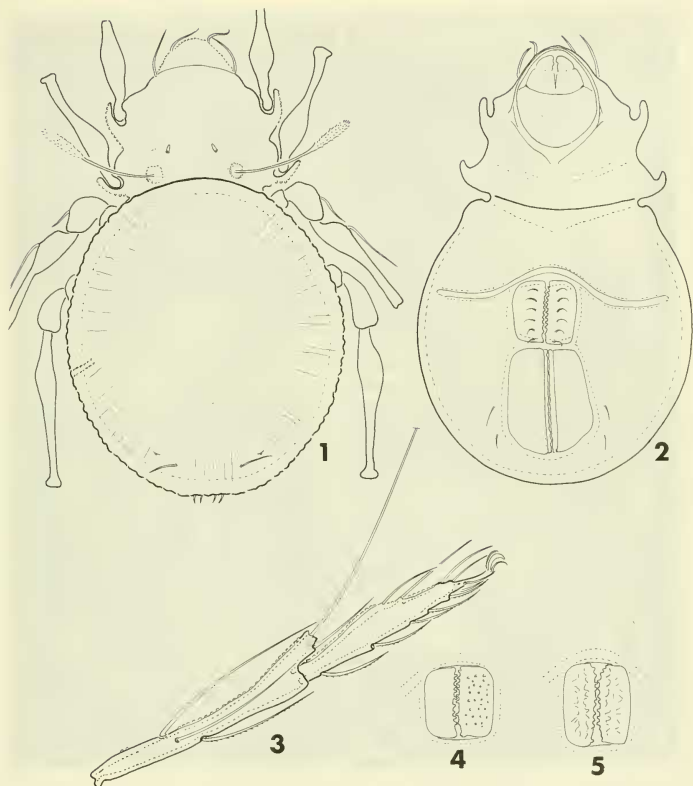
(Figs. 1-5;6-17)

DIAGNOSIS.— With ornate tubercles on both dorsal and ventral surfaces and legs, hence the name *chalazionus*, from the Greek: hailstones, tubercles or knobs (all of which are applicable to the appearance of the tubercles in this instance); interlamellar hairs short, conelike, smooth compared to short, fine, filiform interlamellar hairs in *G. veriornatus*; sensillum clavate, head about twice as broad as in *veriornatus*; medial margins of genital plates toothed, as in *veriornatus*, but plate shorter and wider (see Figs. 4 and 5); without arrangements of six posterior notogastral hairs and reticulate dorsal sculpturing as in *G. veriornatus*, slightly smaller in dimensions than the latter, but both of these species are larger than all other North American species described so far.

DESCRIPTION.— Color dark reddish brown, surface of prodorsum, dorsum of notogaster, venter covered with cerotegument consisting of tubercles; tubercles domelike on dorsum, bothridium and legs (Fig. 6-10), rounded, reticulate, mammiform; tubercles of ventral surface thimble shaped (Figs. 12-15); prodorsum about half as long as notogaster, broadly triangular in shape; rostral and lamellar hairs of about equal length, decurved; lamellae or costulae absent, but a sclerotized line extending medially between lamellar hairs (Fig. 1); interlamellar hairs simple, short, conical, inserted in medial apex of sclerotized, arched, curved bars anteromedial of pseudostigmata; pseudostigmata rounded, with lip erected above surface of prodorsum, covered internally and externally with mammiform tubercles, sensillum clavate, spined, length nearly twice as long as distance between pseudostigmata; tectopodia I and II covered with tubercles.

Hysterosoma nearly rounded in outline, with crenulated margin and wrinkled surface surrounding slightly raised central dome, tubercles arranged in somewhat radiating lines as in drawing (Fig. 1) and SEM micrograph (Fig. 8); posterior margin of notogaster with six hairs and two lyriform pores as indicated in Figure 1.

Camerostome about half the length of propodosoma, mentum broad, rutella narrowed anteriorly; apodemata as shown in Figure 2, ventral setae obscured by integumental covering; apodermata IV arched anteriorly over genital aperture, consisting of a double-ridged arrangement; genital and anal apertures contiguous along entire width; genital covers serrated on medial margin, each cover with 6 genital setae and with nine short medial dentes interlocking covers, surface of covers with tuberculated cerotegument; a sclerotized ring around genital aperture and continuous with similar ring around anal aperture; anal covers longer than wide, with tuberculated cerotegument.



Figs. 1-4. *Gymnodamaeus chalazionus*: 1, dorsal aspect, legs partially omitted; 2, ventral aspect, legs omitted; 3, tibia and tarsus of leg I of female specimen; 4, genital plates.

Fig. 5. *Gymnodamaeus veriornatus* genital plates, drawn to same scale as Figure 4.

Legs with elongated articles, surface covered with mammiform tuberculated integument, similar tubercles on hairs; tibia of leg I with elongated apophysis from which solenidion emerges (Fig. 3); all legs heterotridactylous, median claw larger than laterals.

MEASUREMENTS.— Of the measurable specimens, the size

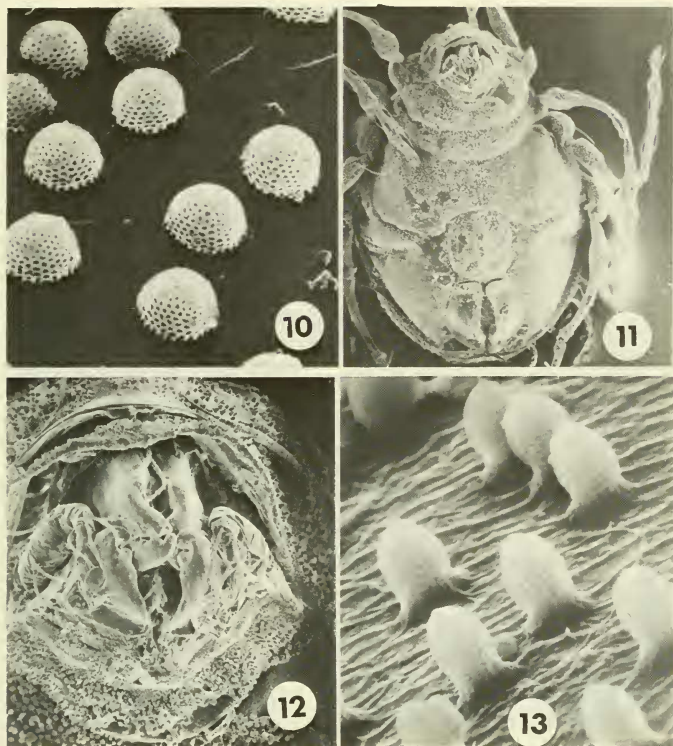
\*Magnifications of all micrographs are plate size. Reductions of the micrographs for printing may alter this dimension slightly.



Figs. 6-9. *Gymnodamaeus chalazionus* scanning electron micrographs: 6, prodorsum, 200X<sup>\*</sup>; 7, pseudostigmata and sensillum, anterior margin of notogaster, 500X; 8, notogaster and leg III, 300X; 9, rim of pseudostigmata and enlarged view of integumental tubercles inside pseudostigmatal cup, 10,000X.

ranges are for length: 804-768  $\mu$ ; for width: 510-450  $\mu$ ; average length 791  $\mu$ ; average width 553  $\mu$ .

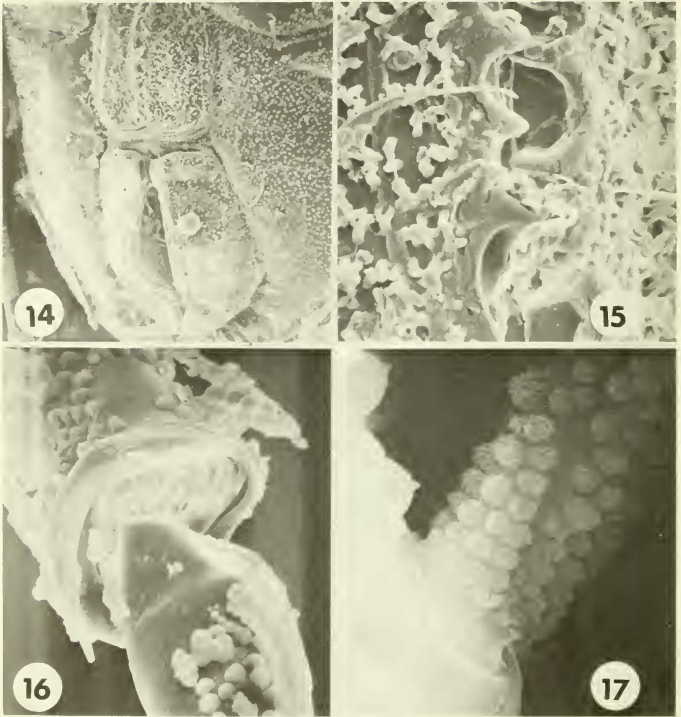
Nine specimens of the species (6 males, 2 females, 1 undetermined sex) taken from Mt. Meeker Camp Ground, Boulder Co., Colorado, 17 July 1952, by T. A. Woolley; numerous additional specimens taken near Fort Collins on different dates, most recently (1971) taken near Hayden, Colorado. The male holotype and one paratype are in the U.S. National Museum, the remaining paratypes are in my collection.



Figs. 10-13. *Gymnodamaeus chalazionus* scanning electron micrographs: 10, mammiiform tubercles of notogastral surface, 10,000X; 11, ventral aspect, 150X; 12, en face view of infracapitulum, showing dorsal chelicerae, ventral rutella and lateral palps, 700X; 13, tubercles of ventral integument, 10,000X.

DISCUSSION.— Seven species of *Gymnodamaeus* were reviewed for this paper, among which is a species of Koch, illustrated and described by Schweizer (1922) under the name *Damaeus femoratus*. The illustrations show that this should be changed to the genus *Gymnodamaeus* as it does not belong in the genus *Damaeus*. Schweizer indicated that the species was found in Algeria, Italy, and Germany.

Of the North American species *Gymnodamaeus veriornatus* Higgins is the largest in size (0.93mm x 0.54mm), with *G. chalazionus*,



Figs. 14-17. *Gymnodamaeus chalazionus* scanning electron micrographs: 14, genital and anal plates, 300X; 15, serrate margin of genital plates 5,000X; 16, leg joint, 300X; 17, leg and leg hair showing integumental tubercles, 10,000X.

next in size ( $804 \mu \times 510 \mu$ ). Hammer's species *G. ornatus* is intermediate in dimensions ( $0.68\text{mm} \times 0.37\text{mm}$ ); *G. gildersleeveae* and *G. elegantulus* have identical measurements ( $0.41\text{mm} \times 0.23\text{mm}$ ). Banks's species are in between others in size, with *G. minor* at  $0.35 \text{ mm}$  long and *G. pearsei* measuring  $0.50\text{mm}$  in length.

Specimens of *G. chalazionus* were used in scanning electron microscopic research and the accompanying micrographs of this species show a three-dimensional detail that is not possible with the diagrams. Although the micrographs are self-explanatory in many respects, it should be noted that the tubercles of the dorsum, the interi-



or of the bothridium, and the surface of the legs and leg hairs are similar—appearing as perforated mammiform structures (Figs. 7-10). The tubercles of the venter are more elongated than those of the dorsum or the other locations (Figs. 11-15).

As stated earlier, Grandjean (1928) assumed that the surface integument of *Gymnodamaeus* was a secreted material. This is borne out by the SEM micrographs (Figs. 6, 8, 11-15) of *G. chalazionus*. Specimens of this species were treated with xylene to determine if the tubercles could be separated or removed from the integument. They remained in place and appear to be wax blooms of different configurations on the dorsum and the venter. Further investigations with the SEM should disclose more details about the structure and chemical composition of these integumental structures in this new species of oribatid.

#### LITERATURE CITED

- BALOGH, J. 1958. Oribates Nouvelles de L'Afrique tropicale. Revue de Zool. et de Bot. Africaines 58(½):1-34.
- BANKS, N. 1947. On Some Acarina from North Carolina. Psyche 54(2):110-141.
- BERLESE, A. 1910. Brevi diagnosi di generi e specie nuovi di Acari. Redia 6:346-388.
- . 1916. Centuria prima di Acari nuovi. Redia 12:19-67.
- GRANDJEAN, F. 1928. Deux nouvelle Oribatei d'Espagne. Bull. Soc. Zool. 53 (6):424-441.
- . 1965. Nouvelles observations sur les Oribates (4e Serie). Acarologia 7(1):91-112.
- HAMMER, M. 1952. Investigations on Microfauna of Northern Canada. Acta Arctica 4:108p.
- . 1958. Investigations of Oribatid Fauna of Andes Mts.-I The Argentine & Bolivia. Biol. Skr. Dan. Vid. Selsk. 10(1):1-129.
- HIGGINS, H. G. 1961. A new beetle mite from Utah (Oribatei-Gymnodamaeidae). Great Basin Nat. 21 (½):27-28.
- JACOT, A. P. 1937. Journal of North American Moss Mites. Journal N. Y. Entomol. Soc. 45(¾):353-375.
- SCHWEIZER, J. 1922. Beitrag zur Kenntnis der Terrestrischen Milbenfauna der Schweiz. Verhandl. Naturforsch. Gesell. in Basel. 33:23-112.